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ABSTRACT

The rise of the World Wide Web as a new information processing technology has attracted the attention of educators worldwide. The purpose of this study was to seek a consensus among art education experts regarding how the Web should be integrated into the art teacher education curricula. The Delphi Method was applied for seeking a consensus. A panel of experts' anonymous individual ratings on specific components of curriculum guidance were recorded, and subjected to several iterations before converging to a final agreement. The concept of integrating Web-based technology into an art education curriculum was accepted by the majority of the panel. Several priority factors found in this study were strongly associated with the popular feature that a Web-based learning style is excellent for immediately delivering information or pedagogical knowledge. In contrast, the concepts related to the potential feature that the Web-based curriculum can develop high learning skills such as problem-solving or creative thinking received less support. Those scale ratings which score lower are proper candidates for additional research as the Web becomes better integrated in art education programs at the college level. The current Web-based technologies will have positive impacts on art education curricula. As the Web-based technology makes progress, the promising features of Web-based learning styles can be incorporated into a sound instructional design. Appendices contain: the criteria for choosing the qualified candidates of the panel; questions of the round one questionnaire; convergence criteria of the coefficient of variation (CV); the round three questionnaire; CV values, difference CVs, and item-level correlations between round two and round three; and the stability and internal reliability coefficients for the total scale and subscales of round three. (Contains 53 references.) (Author/AEF)

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Convergence on the Guidelines for Designing a Web-based Art-teacher Education Curriculum: A Delphi Study

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Paper presented at the annual meeting of the American Educational Research Association April, 24-28, 2000, New Orleans, LA

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ABSTRACT

The rise of the World Wide Web (WWW) as a new information processing technology has attracted the attention of educators worldwide. The purpose of this study was to seek a consensus among art education experts regarding how the WWW should be integrated into the art teacher education curricula. The Delphi Method was applied for seeking a consensus. A panel of experts' anonymous individual ratings on specific components of curriculum guidance were recorded, and subjected to several iterations before converging to a final agreement.

The concept of integrating Web-based technology into an art education curriculum was accepted by the majority of the panel. Several priority factors found in this study were strongly associated with the popular feature that a Web-based learning style is excellent for immediately delivering information or pedagogical knowledge. In contrast, the concepts related to the potential feature that the Web-based curriculum can develop high learning skills such as problem-solving or creative thinking received less support. Those scale ratings which score lower are proper candidates for additional research as the WWW becomes better integrated in art education programs at the college level.

The current Web-based technologies will have positive impacts on art education curricula. As the Web-based technology makes progress, the promising features of Web-based learning styles can be incorporated into a sound instruction design.

Key Words: Curriculum Design; Art Education; World Wide Web

I: INTRODUCTION

A. Background and Rationale

The rise of the World Wide Web (WWW) in recent years as an information processing technology has attracted the attention of educators world-wide. It promotes a new vision of a global, interactive, and dynamic learning tool for students to develop new learning experiences. In fact, one problem puzzling educators today is to accurately evaluate the impact of the WWW on the art education curricula and to effectively exploit this technology to advance art education.

Today, art educators are incorporating the WWW into all four art education disciplines: art history, art production, art criticism, and aesthetics (Getty Center for Education in the Art, 1987). The hope is that students will use it as an important collaborative learning strategy in art. However, applying the Web to art education currently lacks guidelines for formulating strategies for including it in art teacher education curricula. There should be a search for a consensus among art education experts regarding the integration of the WWW into the art curriculum. Such a search is the main focus of this study.

Research efforts about the use of the WWW indicate both its instructional potential and the need for guidance in designing Web-based art teacher education curricula. While several researchers have studied the employment of various aspects of technologically-oriented practices in other disciplines (e.g., science, Stanley & Eugene, 1996), there are no existing protocols in art education for designing a curriculum and an instructional environment using the WWW.

Although the agenda for the WWW has been strongly influenced by the field of computer science, the field of art education must provide the specific content and form for a Web-based art teacher education curriculum (Hicks, 1993; Madeja, 1993; Robinson & Roland, 1994). For example, after learning about a piece of twentieth century abstract art, students can link up to and view a particular collection of color prints of paintings by Picasso or Mondrian. Through the Web-Site system, students will be able to visit the art gallery and virtually experience the exhibition. To promote this vital and growing art education trend, we need the collaboration of art education experts who are knowledgeable about a variety of aspects of the WWW to set and develop the research agenda for an art teacher education curriculum and instructional environment.

A basic challenge for this study was to seek consensus regarding the guidelines for designing Web-based art teacher education curricula. One potential research method of seeking a consensus about the guidelines for the Web-based art education curriculum is the Delphi Method (Dalkey, 1967, 1969, 1972; Sweigert & Schabacker, 1974). The Delphi Method can provide systematic ways of solicitation from a panel of experts who remain anonymous to each other in a series of questionnaire (Dalkey, 1967; 1972). These opinions are then evaluated by the panel over several iterations before converging to a final agreement. The advantages of the Delphi method make it seem well suited for this study.

B. Significance For Art Education

In order for the WWW to contribute to educational reform, teachers must be familiar with it so they can share its resources with students. Borell's (1992) study noticed that "What schools lack is not so much basic hardware, as teacher training in computer use." (p. 11). What is indicated here is the need for training of art education majors to effectively use the Web-based technology and to urge them to adopt an international perspective of art. Both needs are critical issues in art teacher education. Otherwise, future art teachers will not be prepared to teach Web-

based learning skills to their students so that they can access global information(Duchastel, 1996; Hiltz, 1994; Kearsley, 1996). Therefore, the framework for an art education curriculum should include not only a variety of traditional art disciplines in developing a personalized style of art work, but it should also involve training in Web-based technology in order to maximize use of the available tools for art production and research offered by the WWW. Again, the central focus of this study is how should art teacher education programs train art teachers to use the WWW as part of the art studio and in academic art education?

This study will provide art teacher education programs with guidelines, considerations, pedagogical knowledge, Internet skills, and instructional methods related to integrating the WWW into art education for designing Web-based art education curricula. Additionally, the results from this study will contribute to the general body of knowledge about Web-based curricula in college level art education. Furthermore, understanding the influences of Web-based technologies in art education curricula that facilitates art educators' revisions has implications for increasing the number of and the design of art teacher education courses.

C. Statement of Research Purpose and Questions

To investigate the rationale of using the WWW as a teaching tool in an art teacher education curriculum, and to formulate guidelines for designing a Web-based art teacher education curriculum are essential issues in this study. The specific questions for this study are as follows:

(1). How do art educators recommend designing and developing an art teacher curriculum that integrates the Web-based technology for art education students who are learning teaching strategies and practices?

(2). How should a Web-based curriculum be designed to facilitate learning? More specifically, how do we create a more effective learning style among students, the WWW, and the instructors?

(3). What are the curriculum considerations, pedagogical knowledge, Internet knowledge/skill, and instructional methods relevant to using the WWW in an art education curriculum?

(4). How should a WWW-based curriculum be evaluated?

These questions were asked of participants using the Delphi research method. Web-based art education experts took part in the study and have reported their perceptions.

II: LITERATURE REVIEW

A. The Web-based Learning and Teaching Styles

The Web-based technologies have the potential to make learning and teaching more accessible, effective, and interesting. The Web-based learning and teaching styles are discussed further below.

1. Making Learning More Accessible and Convenient

The WWW makes students' learning more accessible and convenient. Kerka (1996) and Sugar & Bonk (1995) both commented that the Web is becoming an effective tool for accessing educational materials, experiencing visual stimulation, communicating with people, integrating learning, and extending the learning environment. Besides serving as a tool to deliver educational subject matter, Web-based technologies create an extensive learning environment so

that students can easily reach networks to access a wide array of information and choose better material that might be nearly world-wide in scope (Kearsley, 1996).

Khan (1997) mentioned that for the Web-based courses, students can search libraries, museums, and databases, or make contact with experts around the globe easily and informally. Students can also pursue independent learning on-line, discuss topics with peers and teachers, and receive feedback and guidelines via educational Web sites. The rapid access to Web resources promotes higher levels of involvement.

Some examples of Web-based home learning can be found at this site: (http://www.yahoo.com/education/k_12/alternative/home_schooling/). In Brouch (1994), Robinson & Roland (1994), and Owston(1997) views are found about these notions: within the framework of Web-based learning , teachers guide students regarding how to navigate the Web with desired learning goals, judge the authenticity of works, compare multiple perspectives on art issues, analyze and integrate diverse information, and organize their understanding of the topic. Teachers can update teaching materials easily, provide guidance and support both synchronously and asynchronously.

2. Facilitating Students' Learning Motivation

Riding, Buckle, Tompson, & Hagger (1994) make the point that students differ in their styles of learning and they can learn more effectively if they choose a suitable learning style. The computer assisted determination of learning styles can serve as an aid to individual learning. Thus, one of the major contributions of the Web is that it can display identical information in a variety of ways to accommodate the students' learning modes and can even strengthen teachers' teaching styles.

Web-based curricula can be designed to use a variety of models of learning styles to integrate the Web in alternative ways for more effective learning. For example, one learning resource linking a variety of other learning resources throughout the world will promote a higher level of motivation for learning (Kearsley, 1996).

Brouch (1994) indicated that linking the computer arts and art subject matter through visual software on the Web produced more positive results in learning. Furthermore, if students post/publish their projects on the Web, it will motivate them by giving their work a sense of importance, and improve their effort and self-esteem (Kearseley, 1996). Furthermore, through the "virtual classroom", students are encouraged by the promise of broadening their exposure to the wider academic community. These Web exposures will promote learning motivation because students feel that their accomplishments are due to their own efforts (Hiltz, 1995). Students are more motivated to enhance their learning capability when the instructional approach strikes their interest and is more compatible with their study modus operandi.

3. Fostering Self-directed Learning Experience to Develop Mastery of the Subject

The WWW allows students to achieve their own objectives and special needs in a "self-directed," "self-paced," and "just-in-time" learning community (Crossman, 1997). The Web's flexible dynamics allows teachers to focus on individual differences, varying the instructional modes, and using different information processing(Riding, Buckle, Thompson, & Hagger, 1994). More concisely, the Web fosters democratic learning(Maddux, 1996); it allows students to determine what is learned, how it is learned, and the environment in which it is learned, as well as tends to allow the individual's own level of participation in on-line discussions (Khan,

1997). Web-based instruction is advantageous to individuals because it allows them to manage their own learning objectives and fit their own special needs.

Research (e.g., Partee, 1996) indicates that if provided with enough interactive time and with direct instructions, students can readily develop mastery of the subject matter. In general, Web-based instruction can help students master their fields in the following ways :(a) providing slow-learners with more time to practice with feedback to master their learning at their own pace; (b) giving students more concise on-line demonstrations of the subject matter (Harasim, Hiltz, Teles, & Turoff, 1995); (c) providing students more intense exposure to the subject matter, and enabling them to integrate the learning objectives(Hiltz, 1994); and (d) incorporating the special feature on the Web (Sol & Birznieks, 1996) that allows teachers to keep track of how many times students visit the Web and for how long. This helps teachers toward a better understanding in order to properly schedule activities for students in a timely fashion.

4. Developing Interactive Experiences in a Global Learning Community

The Web fosters interactive learning experience because it creates a sense of collaboration and communication among people. This learning process stresses active participation and interaction (Hiltz, 1995). For example, through on-line projects, students can interact with persons and on-line resources. Teachers can support and guide students both through synchronous communications, such as text, audiovideo conferencing tools, and through asynchronous communications (Sugar & Bonk, 1995), such as e-mail or newsgroups. These interactive communications motivate students to seek information and to overcome the barriers of geographic distance and time.

Research (e.g., Harasim, Hiltz, Teles, & Turoff, 1995) indicates that students can learn more productively in a collaborative and interactive environment than in a competitive one. This collaborative learning style leads to better acceptance of a variety of learners into a team and will enhance their self-confidence (Harasim, 1993). This indicated that collaborative strategies implemented through the Web provide an active and effective learning method. Such a learning activity permits students to play an active role in learning and allows a teacher to be a facilitator of education. Thus, teachers in the Web-based instructional environment need to act as facilitators and realize that students have high expectations in using the Web.

5. Improving Students' Cognitive Learning Strategies

The Web can not only improve students' mental processes but also reinforce their cognitive abilities to learn independently and achieve academic success (Proctor & Burnett, 1996). Regarding problem solving, Papert (1993) states that "It is not the rule that solves the problem; it is thinking about the problem that fosters learning" (p. 87), and "The kind of knowledge children most need is the knowledge that will help them get more knowledge" (p. 139). Problem-solving and creating art on a computer and connecting to the Web are not linear. They overlap in multi-dimensional ways, so new means of problem-solving and creativity are involved (Keim, 1994). Instead of using teaching techniques that inhibit students' learning processes through prescribed interactions, the Web is used as a cognitive tool for accessing and organizing information, and for analyzing world events (Eklund, 1995). These experiences can fundamentally alter the thought processes of students.

B. Different Perspectives on Web-based Learning Styles

Although several researchers mentioned previously suggest that the Web is a potential tool for learning and teaching, a different point of view needs to be considered. Some educators and researchers (Clark, 1994; Owston, 1997) feel that Web-based learning may be thought of only as a medium for immediately delivering information or pedagogical knowledge, not necessarily as a tool for developing high learning skills such as problem-solving or creative thinking. It indicates that Web-based technologies which permeate curriculum and instruction will not really result in an effective Web-based curriculum.

The key to improving learning with the Web appears to rest on how effectively the Web is exploited in the teaching and learning situation, not on the tool, the Web itself (Clark, 1994, Kozma, 1994). In other words, any improvement of student learning is the result of a sound instructional design, not the tool that delivers the instruction (Clark, 1994, Owston, 1997). The central question of " With the Web-based learning tool, whether students can develop unique and valuable learning skills that they can carry over when they learn without the WWW" (Owston, 1997) still needs to be further investigated.

One problem with the use of the Web-based technology in learning is the lack of logical organisation and the confused array of information on the Web (Maddux, 1996). As a matter of fact, the wealth of Web information demands a whole learning course since up to now few interactive and integrated curricula have been developed. Thus, students may feel overwhelmed by the unrelated chunks of information they are accessing.

Another problem with the use of the WWW in the learning process is the question of reliability and credibility of Web documents. McKenzie (1995) indicates that the Web site documents may not be better resources than books or CD-ROMs because it is hard to assess their reliability. Thus, to develop effective Internet resources for learning, educators need to encourage students' critical thinking and must choose an appropriate instructional model to assess the Web to fit the specific learning goals.

Although much more research is needed to overcome the above problems, it seems clear that, incorporated into a better instruction and curriculum design, the WWW at present offers abundant resources for learning and teaching in a variety of subjects such as art, science, mathematics, etc.

C. The Use of the WWW in Learning Art

1. Impact of the Web-based Technology on Art Teachers

Like teachers in other education fields, art educators face many challenges from the new sophisticated technologies. The conventional methods of teaching artistic work will not be replaced with technology, but the integration of technology into art education will generate values and sensibilities to enable students to function well in an increasingly artificial, technologically cutting age (Hicks, 1993; Robinson & Roland, 1994). There are new technical media that teach color, pattern, and sound as they apply to design, painting, sculpture, and other arts. Furthermore, using the new technology to incorporate art criticism, cultural content, and feedback into art production become necessary for art teacher education students (Robinson & Roland, 1994). In other words, this prospect will bring art and technologies a step closer together. An art teacher needs to see beyond the field of the traditional art to fit into our rapidly advancing age.

Through the Web sites, art teachers currently involved in various aspects of art

participate in multi-cultural art education. For example, through the Web art teachers can become educational leaders in local, national, or international areas of art education. The increasing complexity of dialogue and discussion makes it highly desirable for art teachers to have the capability of fully utilizing the Web to communicate arts internationally (Harasim et al., 1995).

In short, the main requirements for the use of the WWW for art teachers are: (1) Art teachers need to include technology-based teaching and learning styles to support quality learning (Riding, et al, 1994); (2) Art teachers should be capable of navigating the arts by accessing and managing information in the electronic art world (Brouch, 1994) ; (3) Art instruction needs to provide opportunities for students to hone analytical skills in order to evaluate the wealth of information on the Web (Robinson & Roland, 1994); (4) Art teachers must be active participants in the development of Web-based art curricula to meet their educational goals. Thus, art education programs need to specialise in Web training as a critical process in the implementation of art curricula.

2. Web-based Art Learning and Curriculum

The traditional aesthetic perspective of art forms may take on a different meaning when referring to Web-based artworks just as it does to art from different cultures. The vision of the WWW serving as an "information highway" stimulates a dynamic learning process which perhaps can alter the standard definitions of art (Hicks, 1993). Like the Ecofeminist Art which emphasizes "interrelation rather than objects," and examines "ecological, social and culture transformation" (Keifer-Boyd, 1996, p.37), there is a definite change from Web-based artworks toward a content that is directed more toward shared visions and actions.

The WWW really brings us new images to expand our learning in art. As we employ language as a way of learning, the Web can be a kind of specific visual teaching language. The Web's art images allow students to learn about communicating through pictures and diagrams. Pictures can impart information more convincingly than words. The logic of a scheme, the emotional background, or multicultural ideas can all be supplied and expressed vividly. It seems that the Web does provide a broad learning environment that allows students to secure meaningful knowledge in the art education field. But how do art educators put the complex interrelations of the art education domain into an easily understandable Web-based art curriculum? The development of a conservative, disciplined art education with a modern Web-based teaching media is an enormous challenge. This big challenge is for art educators to create a learning tool to enable students to easily progress from one visual arena or idea to another.

(1). A Teaching Model: the Discipline-Based Art Education (DBAE) Model

The rethinking of art education and how the subject matter is taught inspired Discipline-Based Art Education (DBAE). This teaching model, created by the Getty Center for art education, is a program intended to give students broad and rich experiences with art in four fundamental disciplines: art history, art production, art criticism, and aesthetics(Getty Center, 1987). It is regarded as "quality art education" since the subject matter of art education "validated by scholars/artists drawn from the four disciplines" (Clark, Day, & Greer, 1987, p.159). In addition, DBAE stimulates the creativity, understanding, and appreciation of art (McWhinnie, 1988).

The Web has the capacity to provide the visual resources to classes and allow art teachers to teach a discipline-based curriculum (DBAE). A big challenge is for art teachers to use the

interactive system to create a Web-based art curriculum enabling students to shift their interest of their own free will from certain art ideas to others.

(2). The Use of the World Wide Web in Discipline-Based Art Education

The main principle of designing a Web-based teaching tool in instruction typically involves breaking holistic concepts down into smaller segments. For example, the World Lecture Hall (http://www.utexas.edu/world/lecture) has on-line courses that consist of interactive-learning materials, curriculum guidelines, and subject-related resources for students (Owston, 1997). Use of the WWW in a Discipline-Based Art Education practicum is becoming increasingly widespread. Art educators are using it in all the four disciplines--art history, art production, art criticism, and aesthetics--and hope that students will use it as an important collaborative learning strategy in art. This Web-based art curriculum provides pedagogical knowledge and computer skills that permit students to have an array of experiences with art.

Art History: Some museum educators are providing multimedia views of the Art Web Museum (http://mistral.enst.fr/louvre/) (Flake, 1996). Also, some school districts are beginning a joint effort with the National Museum of American Art in Washington D.C. to facilitate the creative use of the WWW. By incorporating art images from the National Museum and linkage with the Internet for some educational art activities, they tied the knot between the WWW and art education as a teaching device (Topp & Grandgenett, 1996).

In another art teaching Web site The University of Maryland, http://www.inform.umd.edu/EdRes/Colleges/ARHU/Depts/artfac/ArtGal/WWW/digvila,a student, after learning about a piece of twentieth century abstract art, views a collection of paintings by Picasso, for example. Students are able to visit a gallery and virtually walk through the exhibition by means of the art Web. There are links to text pages about artists' works. Background information about the works transform the Web site into an "on-line" exhibition. Artists' web pages are available too, and seem to make students want to join in. Art curriculum content and materials are available on the Web. Feedback on the pedagogical knowledge, as well as technological information transmitted through the Web help students doing art history projects (Brouch, 1994; Madeja, 1993).

Due to the WWW, a whole network of sites around the globe, allow for easier and more available responses, thus letting students be in touch with art history sources and people, and promoting a multi-level way to learning (Brouch, 1994; Madeja, 1993; Robinson & Roland, 1994).

Art Production: In teaching how to create art, technologies have remarkable capabilities to increase effectiveness. Teachers can illustrate sculptural shapes by generating computer-based cross sections. Student sculptors can use the same kind of three-dimensional modeling software available to designers to explore concepts and ideas before building maquettes. Artists can use the computer to create desired images (e.g., video images) and also refine visual imagery.

The Web provides immediate feedback and can be used in a spontaneous, fluid manner for exploring composition. Transmitted digital images are available on the Web without loss of clarity (Hicks, 1993). During planning stages variations in the images they create allow students to visualize the final piece graphically. They can make changes in perspective, shape and size where needed. In addition, students are able to obtain results through a variety of multimedia or digital media. Thus, Web-based technology can remarkably reduce the amount of time and energy needed for creating art.

Art Criticism Art educators involved with art criticism have confirmed that the sociology of art has become more prevalent in academic art education (Keifer-Boyd, 1996) . The versatility of the WWW provides broad access to art works around the world and tries to explore the meaning of particular works and relates them to each other for the purpose of criticism. Two sites, the Web Museum and Renaissance & Baroque Architecture, afford the viewers an example of art that can be reviewed and critiqued. The Web Museum site (http://mistral.enst.fr/louvre), has a network of sites around the globe. It allows for fast response and provides a site visit to the Louvre, with not only famous paintings and medieval art but also an auditorium with music from many of the classics and modern multimedia, and a tour of French art history (Flake, 1996). The Renaissance and Baroque Architecture Site (http://www.lib.virginia.edu/dic/colls/arh102/index.html) contains digital images developed by the instructor's excursions to Florence, Venice, and other art locales. This site also provides visitors a special opportunity to scan a picture and to feel the grandeur of the collected architectural masterpieces (Shotsberger, 1996). Students are encouraged to express critical ideas in making judgments about the works by sending E-mail or on-line messages to the Web site, and to justify their evaluations by a description of content, analysis of form, and interpretation.

Aesthetics Aesthetics includes description of qualities, analysis of responses, elaboration, and appreciation. The Web has become an important tool for understanding how people judge art objects. An art show on the Web, with its ability to display multiple perspectives of some art objects simultaneously, provides viewers with a special way to comprehend art works (Hicks, 1993). This will become a vital and growing aesthetic form.

(3). Other Aspects of Web-based Art Curricula and Instructions

By integrating the Web into the curricula and instructions, art educators and students will facilitate the emergence of ideas and spread learning. Hunt (1995) states that a widening gap is developing between what is really taught in pre-service teacher education programs and the technical knowledge required. Students' attitudes towards learning about the new technologies might be a critical factor in the success or failure of Web-based curriculum. Therefore, creating positive attitudes toward the use of the Web seems an integral part of devising a curriculum featuring it.

Today's students prefer active learning over the passive learning. Pantelids (1994) stated that a good Web-based learning program "allows users to become participants in abstract spaces" (p. 175). The Web-based art curriculum will allow students to use multimedia, including hypertext, graphics, sound, and animation, thus providing students with an active method for learning (Maddux, 1996). The Web can create a revolution in art education. Due to the WWW system becoming more reliable, we can look to it to be even more crucial in the improvement of art education.

This new reformation of art education can be combined with pedagogical knowledge by making changes in pre-service teacher education programs. Shotsberger (1996) suggests that educators should design a Web-based pedagogy and design a curriculum that include it. Based on these ideas, creating a Web-based art curriculum in a positive way and organizing it in a vertically developed network will lend assurance that experiences in the Web-based art curriculum promote skills, concepts, and creativity growth.

III: METHODOLOGY

The Delphi Method is a forecasting and information-collecting process. It entails scientific solicitation of experts' judgements on a series or rounds of questionnaires wherein the experts are unknown to each other (Dalkey, 1967; 1972) so that the panel of experts can examine a complex problem effectively (Listone & Turoff, 1975; Sackman, 1975). The Delphi research method served as a tool to assess the criterion of reaching consensus of experts' viewpoints on the research topic. This section describes the research procedures. It was undertaken in three steps: preparatory, implementation and Delphi-based stability analyses. They are described below.

A. Preparatory Stage

The preparatory stage involved two parts. One was to identify art education experts who were considered authorities on the integration of the WWW into art teacher education curricula. , The selection criteria for potential participants were identified as listed in the Appendix A. Ultimately, thirty-two art education experts with an interest in using Web-based technologies in teaching art and who agreed to participate in this study were included. These participants were assured of anonymity regarding their participation.

The second was to conduct a pilot test which generates responses and critiques of a proposed initial open-ended questionnaire. The initial versions of these questions were modified based on the critiques and suggestions of the committee members. The committee consisted of four art education doctoral candidates, two art education/ curriculum and technology-based art education faculty members at the University of Maryland. Eight open-ended questions were decided upon for the Round One Questionnaire (see Appendix B).

B. Implementation Stage

The implementation stage focused on the Delphi research method and includes three rounds of Delphi Iterations. The main thrust of this stage was to obtain the consensus of the opinions of the experts.

1. Open-ended Delphi Round One

The first round questionnaire were sent to panel members by electronic or regular mail. They were asked to provide their opinions about the eight open-ended questions as well as to provide additional information they thought necessary for the integration of the WWW in art education curricula. Three of thirty-two participants responded that they could not participate in the first Round.

One of the limitations in the Delphi method is that there is some likelihood of researcher bias in coding and reporting the responses to the open-ended questionnaires (Judd, 1972; Linstone & Turoff, 1975; Bill, 1992; LeCompte & Preissle, 1993). In order to minimize this possible problem, a data review committee composed of three doctoral candidates in art education and one Ph.D. in English was organized.

The identification of categories representative of the ideas and concepts to be measured was accomplished in the Round one process, resulting in sixty mutually exclusive but exhaustive statements. The sixty statements were categorized into four main classifications: Rationale/Issues, Design/Development Considerations, Knowledge/Skills, and Evaluation

Criteria. The statements in each of these main categories were in turn grouped into one or more key phrases. By adding additional wording to these key phrases, new statements resulted (i.e. the sixty items to be rated for agreement). These statements formed the basis for Round Two 5-point Likert-type scale items.

2. Delphi Round Two

The Round Two Questionnaire was sent out to all 29 experts who had participated in the first round and three new experts who had not originally participated. Each one was requested to rate each item on the 5-point rating scale. They were asked to include recommendations to clarify items, delete irrelevant items, as well as add to and revise the original list with other statements they deemed pertinent.

Their opinions were summarized by means of qualitative and quantitative analyses. The descriptive statistics of a mean with standard deviation, and a median with interquartile range (IQR), defined by the "distance" between the first and third quartiles of a group of scores, were computed. Those indexes measure the central tendency and variability on each item's rating scores.

One of main tasks of the second round was to assess the experts' ratings of how closely they agreed with these statements. The coefficient of variation (CV), defined by the ratio of standard deviation of an item rating score to its corresponding mean, served this purpose (English & Kernan, 1976). The CV index is more appropriate to be used for comparing the measures of variability of items' ratings than the standard deviation because the CV takes into account the measure unit. Appendix C presents the criteria of CV index (English & Kernan, 1976; Dajani, Sincoff & Talley, 1979). If the magnitude of CV for one item is relatively too large (e.g., >0.8), the corresponding statement may need to be modified and an additional round(s) becomes necessary.

The commentaries from the experts' opinions on each item were also viewed by the data review committee.

3. Delphi Round Three

The questions used in the second round were then revised for Round Three Questionnaire based on the round-two qualitative and quantitative analyses. According to the Delphi studies (Woudenberg, 1991; Wang, 1992; Hendricks, 1995; Ferris, 1998), the frequency distribution of the experts' ratings from the second round on each statement were shown to the respondents as part of the Round Three Questionnaire. Woudenberg (1991) supported this procedure, stressing that " statistical feedback in a Delphi can vary from a single number to complete (frequency) distributions" (p. 133). Also, each participant's original rating for the second round was highlighted in color purple at the right margin of the Round Three Questionnaire for each statement.

The format shown in Round Three Questionnaire (see Appendix D) allowed each panel member to visualize where his/her personal opinion rating fell with regard to the group as a whole, without burdening them with the statistics. Thus, "those experts who recognize that the group-based composite judgement may be more compelling than their own may subsequently modify their judgements" (Woudenberg, 1991). This design can be considered as an informal interchanging of viewpoints among experts, and may help to arrive at a consensus.

C. Delphi–based Stability Analyses and Evaluation

As indicated previously, the coefficient of variation (CV) index was computed for each item to measure relative consensus among all items within a round. A disadvantage of this index is the lack of stability measurements of the participants' opinion rating distributions among the different stages of the rounds. The stability measurements for establishing consensus between two rounds were evaluated using the CV difference between two rounds for each item. According to Dajani (1979), stability is considered reached when the absolute value of these differences among the rounds reaches a small value. Otherwise, more rounds are required. Ideally, the CV value obtained from the latter round should be relatively smaller than an earlier round.

Another alternative stability measurement used in this study is the degree of association between two round ratings of experts on the same item. The Pearson correlation coefficient was used for this measure. If a statement's correlation coefficient is statistically significantly different from zero and relatively high, the experts' ratings on this item are stable and less fluctuated. Otherwise, this item's ratings fluctuate between two rounds. The above method is used to measure the item-level stability between rounds. The scale-level stability can also be assessed by computing the correlation coefficient (Crocker & Algina, 1986) between two-round scale values (e.g., total scale and all subscales). The definition of scale or subscale is a group of items that is derived from the same category or similar key partial statements. The scale-level coefficients of stability were also estimated in this study.

Since stability had been achieved and convergence was obtained in the third round, no subsequent Delphi rounds were necessary. The results based on this Delphi are presented in and discussed in the following section.

IV: ANALYSIS AND RESULTS

A. Final-round Data Analyses and Evaluation

1. Delphi Convergence and Stability Analyses

The Round Three CV value for each statement is presented in the Appendix E. All CV values are less than the critical value, 0.5. This finding is consistent with the Round Two results and indicates that the Delphi convergence of consensus on each statement has been achieved in this study. The Delphi stability of consensus was examined by using the Difference CV-- the Round Three CV minus the Round Two CV. The corresponding results are shown in the Appendix E. It requires a decrease in CV value between Round Two and Round three. The statement of A05 did not quite meet with this criterion, although the item's CV values from two round are very close. The result from the difference CV value of each item indicates that the Delphi stability of consensus for each statement has been achieved.

2. Item-level Correlation Analysis

Another alternative to measure stability is to compute each item-level correlation coefficient between the Round Two and Round Three ratings. If the magnitude of an item's correlation is relatively large and is statistically significant from zero, the stability measure of this item or statement has been achieved. As seen on the right side of Appendix E, all correlation values are relatively large and are in fact statistically significant from zero. These results confirm the previous stability analysis, that is, a stability of consensus for each statement has been achieved.

3. Instrument Stability and Internal Analysis

The total and subscale stability coefficients were calculated and are presented in Appendix F. Those scale-level stability coefficients are very high and suggest that the panel's ratings on the intended measures were very stable. The internal reliability measure on each scale is also presented in Table Appendix F; these internal reliability coefficients are close to those obtained from the second round.

Based on the above analysis, stability had been achieved by the third round and convergence was obtained between second and third rounds. Therefore, no subsequent Delphi rounds were necessary. Finally, the results were presented in form of a final statement of consensus. Greater detail of the statements within each category will be presented later.

B. Summary Results

Seven key problems associated with integrating the WWW into art education curricula were extracted from the responses to the open-end questionnaire by the panel members. Several issues or statements were posited under each key problem. The statements within each of the seven problems were to be ranked in accordance with the mean importance rating of a Likert-type scale. These problems were ranked by the art education experts and a summary of the ratings along with a restatement of each question results is given below.

Question A. What are the important rationale issues related to the integration of WWW into art teacher education curricula?

Table 1. Rank Order of Importance of Each Response- Question A

Rank	Mean	Statement
1	4.8	Guiding students to use the WWW as one of a multiplicity of resources.
2	4.7	Facilitating professional networking communication, by offering the opportunity to relate to other art educators and students, and share ideas, concerns and solutions.
3	4.6	Supplementing the conventional art education curricula, particularly for research in art history and cultural heritage, as well as the study of artists and their works.
4	4.3	Developing pre-service art teacher education courses that teach WWW skills.
5	4.2	Using the WWW for curriculum change to achieve the desired goals of art education.
6	4.2	Developing high level learning strategies and skills (e.g., critical thinking, independent problem solving , creative abilities) through the discussion of potentially intellectual art issues.
7	4.2	Providing an understanding of art within the world-wide community and thus broaden knowledge of the more extensive field of art education.
8	4.1	Gaining the support of the school system's teachers, parents and administrators acquainting them with the goals and roles of Web-based art education curricula.
9	3.9	Developing the protocols/agenda for using WWW resources in art education.
10	3.6	Including the role of human emotion in the interpretation of computer artwork.

Eight of ten statements were rated above 4 , indicating that panel members agreed with their important characteristics associated with Rationale /Issues. The factors of "Guiding students to use the WWW as one of a multiplicity of resources" and "Facilitating professional

networking communication" were found to be the first and second most important respectively. Actually, these two factors are relatively easy to implement in practice. In contrast, the factor "Including the role of human emotion in the interpretation of computer" may be hard to achieve in current technology and was ranked last. A knowledgeable critic who has viewed the response thinks it is highly important and needs to be considered. The factor of "Developing the protocols/agenda for using WWW resources in art education" was placed next to last. The researcher believes this factor should not be rated so low since it would play a significant key role in integrating the Web-based learning style into an art education curriculum. Perhaps it wasn't fully understood by the panel members.

Question B. What factors need to be considered when Web-based technologies are integrated into the design and development of art education curricula?

Table 2 :Rank Order of Importance of Each Response- Question B

Rank	Mean	Statement
1	4.3	Promoting new vision as a global, multicultural, and dynamic interaction and communication tool for improving art education quality.
2	4.3	Considering both aesthetic and technical perspectives to enhance the purposes and functions of art education.
3	4.3	Including legal and ethical information such as Web copyright issues associated with the Web designs of other users.
4	4.2	Encouraging maximum use of traditional art education materials and processes, and integrating them with these technologies.
5	4.1	Providing an opportunity for self-expression.
6	3.9	Using the model of Discipline-Based Art Education (DBAE) as an integrated method of learning.
7	3.9	Developing graphic design (e.g., virtual 3-dimension image) on the Web for computer animation.

Five of seven statements were rated above 4 , indicating that panel members agreed to their being considered important characteristics. The factor of "Promoting new vision as a global, multicultural, and dynamic interaction and communication tool for improving art education" was placed first in importance. This principle is very similar to the first and second ranked statements generated from question A. It implies that making communication easy is a key factor while working on Web-Based curriculum design. The factor of "Using the model of Discipline-Based Art Education (DBAE) as an integrated method of learning" did not rank relatively high although the Discipline-Based Art Education (DBAE) is considered a sound teaching model in the art education field. One possible reason is that the term "DBAE" edited in the questionnaire may not have been fully comprehended by some members of the panel. In order to overcome to this problem, a clear definition of this term should be included in any future questionnaire. Moreover, DBAE is controversial in many art education circles. Hopefully, through the specific research question associated the integration of DBAE into the Web-based art education curriculum may help art educators understand this issue better.

Question C. The Web-based art education curricula can facilitate learning by what?

Table 3: Rank Order of Importance of Each Response- Question C

Rank	Mean	Statement
1	4.4	Enhancing collaborative experience via on-line collaborative projects.
2	4.4	Providing a new way of distance learning. Students may download course materials, participate in interactive tutorials on the Web, utilize on-line databases.
3	4.3	Encouraging electronic interaction between people through an on-line communication group or interactive conferencing.
4	4.3	Allowing students both individually and collaboratively, to explore problems and seek multiple solutions.
5	4.1	Making art learning more accessible to the extremely diverse population of Internet users.
6	3.9	Allowing flexible participation in class at student's own pace and schedule.
7	3.9	Allowing different learning styles.
8	3.8	Applying cognitive and social interaction theories to create active learning strategies and honing skills on the WWW.

All the statements on this question concern Web-based learning and teaching styles. Five of eight statements were rated above 4 , indicating that panel members agreed that these factor should be considered if we expect a Web-based curriculum design with the aim of facilitating student learning. The factor of "Enhancing collaborative experience via on-line collaborative projects" was ranked "first" for facilitating learning. In contrast, the factor of "Applying cognitive and social interaction theories to create active learning strategies and honing skills on the WWW" was relatively ignored. One likely reason for this is that the theories of cognitive and social interaction may seem too complicated to be implemented in the current Web-based learning environment or any other for that matter. The responses to "Allowing flexible participation in class at student's own pace and schedule" and "Allowing different learning styles" were highlighted in the topic of the Web-based learning styles, but they were not as highly rated as the researcher expected.

Question D. The use of the Web-based technologies in art education curricula can apply principles of the cognitive learning model by what ?

Table 4. Rank Order of Importance of Each Response- Question D

Rank	Mean	Statement
1	4.3	Requiring students to think about, analyze, and distinguish the accuracy of the data on the Web.
2	4.1	Criticizing and evaluating the quality of images and of information received from the WWW and their impacts on art education.
3	4.0	Providing on-going dialogue and interaction between students and teachers regarding contributions from various media presentations.
4	4.0	Identifying the issues and dilemmas present in Web-based art teacher education.
5	3.9	Guiding students to where they see the connection and possibilities between the capabilities of the Web and their professional success.
6	3.7	Encouraging that students research the Web about sharing aesthetic ideas with students in other domains.

Four of six statements were rated above 4 , indicating that panel members agreed that these factors should be considered if we attempt to apply the principles of the cognitive learning model on a web-based curriculum design. The factors of "Requiring students to think about, analyze, and distinguish the accuracy of the data on the Web" and "Criticizing and evaluating the quality of images and of information received from the WWW and their impacts on art education" received higher ratings. From this, it becomes clear that students must learn to distinguish fact from opinions and how to interpret what they find. In contrast, the factor of "Encouraging that students research the Web about sharing aesthetic ideas with students in other domains" was rated less important on this question. This factor is one of the elements of DBAE that is always controversial.

Question E. The instructional strategies for using Web-based technologies in art education classrooms are by what ?

Table 5. Rank Order of Importance of Each Response- Question E

Rank	Mean	Statement
1	4.5	Having a concise purpose/specific goal when doing Internet exploration.
2	4.3	Using a variety of windows to access historical, cultural, artists intent/beliefs, artist skills, audience expectation and display.
3	4.2	Having the option of sending picture and text files electronically for information, collection and distribution.
4	4.2	Displaying professionally designed teaching materials(skills and concepts) on the Web.
5	4.1	Listing subject matter and explicitly suggesting instructional strategies that include a range of images, and contextual information
6	4.0	Formulating appropriate procedures or actions to resolve problems raised in the Web-based learning program.
7	3.9	Applying miscellaneous types of knowledge (e.g. art concepts, pedagogical method) on the Web.
8	3.9	Tailoring to the domains of Discipline-Based Art Education (DBAE) to research and instruction, exposing students to work from each content area.
9	3.9	Including in the pedagogy an assessment phase, a planning phase, and a delivery platform.
10	3.7	Using E-mail comments about instructional content on the Web site.
11	3.5	Developing techniques to reduce the fear associated with the use of Web-based technologies.

Six of eleven statements were rated above 4 , indicating that panel members agreed that these factor should be considered when we attempt to apply the instructional strategies to a web-based curriculum design. The factor "Having a concise purpose/specific goal when doing Internet exploration" was highly rated. This result is consistent with general instructional design principle that setting concise goals is critical to achieving effective teaching. Also, the factor "Using a variety of windows to access historical, cultural, artists intent/beliefs, artist skills, audience expectation and display" may improve students' learning interest and motivation.

The factor "Developing techniques to reduce the fear associated with the use of Web-based technologies" received less attention. Possible because some of the panel members did not have a bit of experience with the WWW. As the new technology improves, creating a friendly interface for Web-based learning will become much easier.

Question F. What the special knowledge and skills of Web-based technologies are needed ?

Table 6. Rank Order of Importance of Each Response- Question F

Rank	Mean	Statement
1	4.6	Incorporating design principles and composition knowledge and skills, such as color, shape, form, image manipulation, page layout and presentation into the Web sites.
2	4.5	Knowing how to locate, subscribe to and use the Web and Internet communication system (e.g. E-mail, Internet on-line) to obtain and exchange information from art museums, art education groups, and other resources.
3	4.5	Developing a sensitivity for what constitutes an effective Web page text, graphic, sound and animation in order to reflect the portfolio effectively.
4	4.5	Having basic computer technical knowledge such as acquiring software and configuring Web browsers to access the resources contained in the Web.
5	4.3	Knowing how to combine, link resources and address the sequencing of materials presented on the Web.
6	4.3	Posing and refining questions, analyzing and synthesizing vast amounts of information.
7	4.2	Placing current Web-based art projects in historical perspective, linking them to past and possible future developments.
8	4.1	Knowing how to integrate the specialized art knowledge with the skills of curriculum and instructional experts, programmers, and media support experts.
9	4.0	Developing an aesthetic critical appreciation for artworks created by technologies and presented on the Web.
10	4.0	Determining the mix of lecture and Web-based technologies to use based on professional judgement and perception of the abilities of the class to absorb this knowledge.

What are the special knowledge and skills of Web-based technologies needed ? Ten factors related to this questions were highly rated as substantive. The factor "Incorporating design principles and composition knowledge and skills, such as color, shape, form, image manipulation, page layout and presentation into the Web sites" was rated as the first priority. It appears clear that the primary skills needed for Web-based art learning are the same as those needed for conventional art learning. The knowledge associated with the Internet is also highlighted.

Question G. What are the criteria that should be used to evaluate the Web-based art teacher education curricula?

Table 7. Rank Order of Importance of Each Response- Question G

Rank	Mean	Statement
1	4.4	The effectiveness of the Web-based technologies in promoting student learning.
2	4.4	The concise program goals or philosophies , student performances, processes, products and/or learning outcomes.
3	4.2	The quality of art content provided.
4	4.1	Engaging in students' self-criticism and encouraging on-line suggestions from peers about artworks.
5	4.1	Posing topics, issues, and authentic life-based situations for further investigation and stimulate professionalism among life long learners.
6	3.9	Real world problems, client-direction problems, creative writing, etc.
7	3.8	The general artistic criteria (e.g., principle of design, element of aesthetic).
8	3.7	Having mobility among various aesthetic roles to place current Web-based art projects in historical perspective, linking them to the past and possible future developments.

Web-based art education curriculum designs are growing rapidly. The issue "What are the criteria that should be used to evaluate the Web-based art education curricula ?" will receive more attention. The factor "The effectiveness of the Web-based technologies in promoting student learning" was highly emphasized as well as the factor "The concise program goals or philosophies , student performances, processes, products and/or learning outcomes". In contrast, the factor "Having mobility among various aesthetic roles to place current Web-based art projects in historical perspective, linking them to the past and possible future developments" was ranked last.

C. Comments From Panel Members

Besides statistical evaluations, several valuable comments on some of the items or on this research topic from some members of the panel are given below.

Category II: Design/Development Considerations- Scale B: "Web-based technologies can be integrated into the design and development of art teacher education curricula by:" The first statement – " Using the model of Discipline-Based Art Education (DBAE) as an integrated method of learning" indicated a wide hiatus between Neutral/Disagree and agree/strongly agree comments. Also, the ratings on this statement didn't change between the response of Round Two and Round Three. This statement created controversy over Discipline-Based Art Education (DBAE) as an integrated method for Web-based art education curricula. Some panel members thought that they have different agendas and that the model of DBAE which permeated art education curricula should not really result in an effective Web-based art education curricula. Meanwhile other panel members thought the DBAE should be a good model as an integrated method of learning Web-based art education curricula because it provides a way of exploring and expressing the essence of aesthetics, art history, criticism and art studio of art education curricula using the Web-based technologies.

Category III: Knowledge/Skills- Scale F : "The special knowledge and skills of Web-

based technologies needed by art education students are:" The eighth statement – "Determining the mix of lecture and Web-based technologies to use, based on professional judgement and perception of abilities of the class to absorb this knowledge." generated varying views. Some participants felt it was too idealistic to achieve. Several panel members thought that its success would depend on the possibility of having resources to build Web network systems in all the schools and the applicability of the Web network resources to visual art education.

Although most members of the panel agreed that the Web-based technologies will have a positive impact on art education curricula, some members remained skeptical. For instance, one comment is related to the practical concern in implementing Web-based Art education curricula. That is: " I have been using E-mail as a means of communicating with art student teachers out in the field --- it is somewhat successful, but limited due to unequal access to computer/Internet. I have the luxury of a home computer --- most of the art student teachers had to return to campus & use a lab --- which meant they did not check email regularly. This should be a concern in implementing web-based art education curricula."

One member made commented: " The WWW should be used as a research and communication tool. Its usefulness as a delivery system for instruction is very limited in its current state." A similar comment found that: "Somehow you will have to help students understand the relationship between technology and traditional materials --- Is the Web only a resource-gathering instrument, is it an art medium, etc."

One panel member (who had strongly disagreed on several other statements) strongly disagreed on this one too, and commented that: " As time passed, I find myself surer of my responses to the current hysteria surrounding computer/telephone technologies. With the historical perspective provided by the old technologies when they were new, ... the current hubbub seems more of a cover for corporate jockeying than aesthetic revolution."

V: CONCLUSIONS

The concept of integrating Web-based technology into Art education curriculum was accepted by the majority of the panel. The experts' viewpoints on this issue were stable and consistent between the Round Two and the Round Three since the stability coefficient (r=0.96, test-retest reliability) of the questionnaire used in this study was relatively high. Also, some revised statements of the Round Three resulted in more positive opinions, compared to the responses from the Round Two.

Several high-ranked factors found in this study were strongly associated with the popular feature that the Web-based learning style is an excellent medium for effectively delivering pedagogical knowledge or information. In contrast, the factors related to the potential feature that the Web-based curriculum might develop high-level learning skills such as problem-solving or creative thinking received less support. A few members of the panel thought that its role as a delivery system for instruction, especially in teaching art, is very limited in its current state.

As we are aware, the current Web-based technologies will have a positive impact on art education curricula, but whether it will bring all the potential benefits introduced in the Literature Review still remain problematical. As the Web-based technology makes dramatic progress (e.g., having the features of ready access and proven pedagogical worth) and an effective instruction and curriculum design is incorporated into it, all the promising features of Web-based learning and teaching styles might be achieved. Of course, the outcome of these issues is yet to be reached. Much more research is needed to build a sound Web-based learning model.

In addition, the key issue of integrating Web-based technology into the art education teaching model of Discipline-Based Art Education (DBAE), did not gain strong support. A few panel members thought that there were better agendas and that using the DBAE as a guidance model melded into art education would not really result in a good Web-based art education curriculum. Other panel members were of the opinion that the DBAE would be an appropriate model because it provided a broad framework of exploring and expressing the essence of the visual art standards: aesthetics, art history, criticism and art studio of art education curricula using the WWW. More specific research topics on DBAE within the Web-based learning style are needed for a better understanding of this problem, particularly human emotion in art.

In light of the results of this study, these recommendations are made for future research:

1. The potential features that Web-based learning can develop high learning skills such as problem-solving or creative thinking were rated relatively low as compared with its popular features as a teaching-medium/tool. As more advanced Web-based technology is developed and incorporated into a sound instruction and curriculum design, the question of whether these great potentials can be successfully achieved is worth studying. Since the knowledge regarding this problem is not yet widespread, more study is needed to build a sound Web-based learning model.

2. The Discipline-Based Art Education (DBAE) is considered a sound teaching model because it provides a way to explore and express the essence of aesthetics, art history, criticism, and studio art education curricula. Evaluating the possibility of creating an art teacher education curriculum that combines Web-based technologies with the teaching model DBAE is highly desirable for a better understanding of this issue.

3. Although most members of the panel agreed that Web-based technologies will have positive impacts on art education curricula, some members remained skeptical. They argued that

the key to improving learning with the Web appears to rest on how effectively the Web is incorporated into a sound instructional design, not on the tool, the Web itself. They thought that the instructional design plays the significant role in any improvement of students learning, not the tool. The question, as introduced in this study's literature review, still needs to be further investigated. That is: " With the Web-based learning and teaching style, can students develop unique and valuable learning skills that they can carry over when they learn without the WWW?"

4. Since the sample size of this Delphi study is small and the elite panel participants may not be fully representative of the target population, the study's external validity may be in some question. More research on this topic is suggested using a larger number of experts, and perhaps an even more diverse group. In the future, we might expect that the Web-based Delphi method will overcome any problems that the current Delphi method is facing. For example, Web-based networking, such as distributing survey forms at professional conferences, to be filled in and archived as E-mail comments, could open up more interaction and contribute a variety of viewpoints to the art education study.

5. Since there were a few non-responses throughout the rounds of the Delphi process or missing responses on some statements, there could be some non-response bias. Also, any Delphi study does not present the most optimal judgement of the panel members, but rather an averaged compromise that draws from the combined perceptions and biases of the panel's experts (Toohney & Shireffs, 1980; Scaffa, 1992). The tentative guidelines for designing a Web-based art teacher education curriculum that were originated in this study might well be tested (e.g., replication made of this kind of study to check the reliability and validity of the results) in order to minimize these possible biases.

Appendix A

The Criteria for Choosing the Qualified Candidates of the Panel

1. Art educators who have published articles related to use of the WWW in art education in professional journals of art education, such as *Studies in Art Education, Art Education,* between 1990 and 1997.
2. Art educators who have made presentations on issues related to Web-based technology in art education curricula at the National Art Education Association (NAEA) Conferences between 1995 and 1997.
3. Art educators who are members of the National Art Education Association (NAEA) Electronic Media Interest Group (EMIG).

Appendix B

The Questions of the Round One Questionnaire

1. From your perspective, how do you design and develop an art education program that integrates the new technology, the WWW?
2. From your perspective, how should the WWW-based curriculum be designed to facilitate learning? More specifically, what are the considerations, pedagogical knowledge, and instructional methods relevant to using the WWW in an art education curriculum?
3. From your perspective, how do art education major students apply principles of cognitive learning models to the use of the WWW in the art curriculum? Put another way, how do you form a cognitive learning perspective leading to a more effective interaction between students, the WWW, and the instructors?
4. Based on your experience, how have Web-based technologies influenced the number of and the design of art education curricula?
5. Describe how the inclusion of Web-based technology courses affects the creative thinking and problem solving processes of art education students. In the other words, is there a perceptible difference in the way students perform now as opposed to how art education students performed prior to the inclusion of Web-based technology related courses?
6. In your opinion, what types of special knowledge or skills need to be emphasized in an art teacher education curriculum devoted to Web-based technologies?
7. How have Web-based technologies enhanced or diminished interaction of colleagues within your own discipline? With other disciplines?
8. From your perspective, what criteria (i.e., methods, subject matter, student creations, test results, etc.) should be used to evaluate the Web-based art education curricula?

Appendix C

The Convergence Criteria of the Coefficient of Variation (CV)

Value of CV	Decision Rule
0< CV <= 0.5	Good Convergence - no need for additional round
0.5<C V <= 0.8	Mediocre Convergence - possible need for additional round(s)
CV > 0.8	Poor Convergence - definite need for additional round(s)

Appendix D

Integrating the Web-Based Technologies into Art Education Curricula Round Three Questionnaire

We are interested in your opinion about integrating the World Wide Web (WWW) into the art education curriculum. The following list of statements is your responses in the second round. Your original response is marked at the right margin in purple. Each statement is followed by a frequency distribution of the thirty-two responses made by the participants of expert panel.

If you wish to change your response, please circle your new response. If you do not wish to change your response, do nothing.

1-Strongly Disagree	*2-Disagree*	*3-Neutral/No Opinion*	*4-Agree*	*5-Strongly Agree*

* Indicates statement has been change based on second round suggestions.

I. Rationale/ Issues

A. The important issues related to the integration of the WWW into art teacher education curricula are:

*1. Using the WWW for curriculum change to achieve the desired goals of art education. *1 2 3 4 5*

1. Strongly Disagree 0
2. Disagree * 1
3. Neutral /No Opinion * * * * 4
4. Agree * * * * * * * * * * * * 12
5. Strongly Agree * * * * * * * * * * * 11

Blank * * * * 4

*2. Developing pre-service art teacher education courses that teach the WWW skills. *1 2 3 4 5*

1. Strongly Disagree 0
2. Disagree * * * * 4
3. Neutral /No Opinion * * 2
4. Agree * * * * * * * * * * * * * * 14
5. Strongly Agree * * * * * * * * * * * * 12

Blank 0

3. Developing the protocols/agenda for using the WWW resources in art education. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree * * * * * 5
3. Neutral /No Opinion * * * * * * 6
4. Agree * * * * * * * * * * * 11
5. Strongly Agree * * * * * * * * 8

Blank 0

4. Gaining the support of the school system's teachers, parents and administrators by acquainting them with the goals and roles of Web-based art education curricula. *1 2 3 4 5*

1. Strongly Disagree 0
2. Disagree * * * * 4
3. Neutral /No Opinion * * * * 4
4. Agree * * * * * * * * * * * * * * 14
5. Strongly Agree * * * * * * * * * * 10

Blank 0

5. Facilitating professional networking communication, by offering the opportunity to relate with other art educators and students, and share ideas, concerns and solutions. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree 0
3. Neutral /No Opinion * * * 3
4. Agree * * * * * * * * 8
5. Strongly Agree * 20

Blank 0

6. Supplementing the conventional art education curricula, particularly for research in art history and cultural heritage, as well as the study of artists and their works. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree 0
3. Neutral /No Opinion * * 2
4. Agree * * * * * * * * 8
5. Strongly Agree * 20 Blank 0

7. Developing high level learning strategies and skills (e.g., critical thinking, independent problem solving , creative abilities) through the discussion of potentially intellectual art issues. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree * * 2
3. Neutral /No Opinion * * * * 4
4. Agree * * * * * * * * * * * 11
5. Strongly Agree * * * * * * * * * * * * * * 13 Blank * 1

*8. Including the role of human emotion in the interpretation of computer artwork. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree * * * * * * 6
3. Neutral /No Opinion * * * * * 5
4. Agree * * * * * * * * * * * 11
5. Strongly Agree * * * * * * * 7 Blank * 1

9. Guiding students to use the WWW as one of a multiplicity of resources. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree 0
3. Neutral /No Opinion * * 2
4. Agree * * * * * * 6
5. Strongly Agree * 22 Blank * 1

10. Providing an understanding of art within the world-wide community and thus broaden the knowledge of the more extensive field of art education. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree * * * 3
3. Neutral /No Opinion * * 2
4. Agree * * * * * * * * * 9
5. Strongly Agree * * * * * * * * * * * * * * * * 15 Blank * 1

II. Design/Development Consideration

B. Web-based technologies can be integrated into the design and development of art teacher education curricula by :

*1. Using the model of Discipline-Based Art Education (DBAE) as an integrated method of learning. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree * * * 3
3. Neutral /No Opinion * * * * * * * * 8
4. Agree * * * * * * * * * 9
5. Strongly Agree * * * * * * * * * * 10 Blank 0

2. Providing an opportunity for self-expression. *1 2 3 4 5*

1. Strongly Disagree 0
2. Disagree * 1
3. Neutral /No Opinion * * * * * * * * 8
4. Agree * * * * * * * * * * * * * * * * * * 17
5. Strongly Agree * * * * * * 6 Blank 0

3. Considering both aesthetic and technical perspectives to enhance the purposes and functions of art education. *1 2 3 4 5*

1. Strongly Disagree 0
2. Disagree * 1
3. Neutral /No Opinion * * * 3
4. Agree * * * * * * * * * * * * * * * * * * 17
5. Strongly Agree * * * * * * * * * * * 11 Blank 0

4. Promoting new vision as a global, multicultural, and dynamic interaction and communication tool for improving art education quality. *1 2 3 4 5*

1. Strongly Disagree * * * 3
2. Disagree 0
3. Neutral /No Opinion * * 2
4. Agree * * * * * * * * * * 10
5. Strongly Agree * * * * * * * * * * * * * * * * * * 17 Blank 0

5. Developing graphic design (e.g., virtual 3-dimension image) on the Web for computer animation. *1 2 3 4 5*

1. Strongly Disagree 0
2. Disagree * * 2
3. Neutral /No Opinion * * * * * * * * * * * 11
4. Agree * * * * * * * * * * * * * * * 14
5. Strongly Agree * * * * * 5 Blank 0

6. Encouraging maximum use of traditional art education materials and processes, and integrating them with these technologies. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree 0
3. Neutral /No Opinion * * * * * 5
4. Agree * * * * * * * * * * * * * * * * * * 17
5. Strongly Agree * * * * * * * * 8 Blank 1

*7. Including legal and ethical information such as Web copyright issues associated with the Web designs of other users. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree * 1
3. Neutral /No Opinion * * * * * * 6
4. Agree * * * * * * * * * * * 11
5. Strongly Agree * * * * * * * * * * * 11 Blank 2

C. The Web-based art education curricula can facilitate learning by :

1. Applying cognitive and social interaction theories to create active learning strategies and honing skills on the WWW. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree * * 2
3. Neutral /No Opinion * * * * * * * * * * 10
4. Agree * * * * * * * * * * * 11
5. Strongly Agree * * * * * * * * 8 Blank 0

*2. Allowing for different learning styles. *1 2 3 4 5*

1. Strongly Disagree **** 4
2. Disagree * 1
3. Neutral /No Opinion ********* 9
4. Agree ********* 9
5. Strongly Agree ********* 9 Blank 0

*3. Allowing students both individually and collaboratively, to explore problems and seek multiple solutions. *1 2 3 4 5*

1. Strongly Disagree ** 2
2. Disagree 0
3. Neutral /No Opinion **** 4
4. Agree ********** 10
5. Strongly Agree ********** 16 Blank 0

4. Encouraging electronic interaction between people through an on-line communication group or interactive conferencing. *1 2 3 4 5*

1. Strongly Disagree ** 2
2. Disagree 0
3. Neutral /No Opinion *** 3
4. Agree ********** 10
5. Strongly Agree ********** 17 Blank 0

5. Enhancing collaborative experience via on-line collaborative projects. *1 2 3 4 5*

1. Strongly Disagree ** 2
2. Disagree 0
3. Neutral /No Opinion **** 4
4. Agree ********** 10
5. Strongly Agree ********** 16 Blank 0

6. Making art learning more accessible to the extremely diverse population of Internet users. *1 2 3 4 5*

1. Strongly Disagree ** 2
2. Disagree *** 3
3. Neutral /No Opinion **** 4
4. Agree ********** 11
5. Strongly Agree ********** 12 Blank 0

7. Allowing flexible participation in class at student's own pace and schedule. *1 2 3 4 5*

1. Strongly Disagree ** 2
2. Disagree ** 2
3. Neutral /No Opinion **** 4
4. Agree ********** 14
5. Strongly Agree ********** 10 Blank 0

8. Providing a new way of distance learning. Students may download course materials, participate in interactive tutorials on the Web, utilize on-line databases. *1 2 3 4 5*

1. Strongly Disagree ** 2
2. Disagree *** 3
3. Neutral /No Opinion * 1
4. Agree ******* 7
5. Strongly Agree ********** 19 Blank 0

D. The use of the Web-based technologies in art teacher education curricula can apply principles of the cognitive learning model by:

*1. Identifying the issues and dilemmas present in Web-based art teacher education. *1 2 3 4 5*

1. Strongly Disagree 0
2. Disagree * * * * * 5
3. Neutral /No Opinion * * * * * 5
4. Agree * * * * * * * * * * * * * * * * 15
5. Strongly Agree * * * * * * 6 Blank 1

*2. Criticizing and evaluating the quality of images and of information received from the WWW and their impact on art education. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree * * * * 4
3. Neutral /No Opinion * * * * * 5
4. Agree * * * * * * * * * 9
5. Strongly Agree * * * * * * * * * * 10 Blank 2

*3. Requiring students to think about, analyze, and distinguish the accuracy of the data on the Web. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree * 1
3. Neutral /No Opinion * * 2
4. Agree * * * * * * * * * * 10
5. Strongly Agree * * * * * * * * * * * * * * * * 15 Blank 2

4. Guiding students to a place where they see the connection and possibilities between the capabilities of the Web and their professional success. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree * 1
3. Neutral /No Opinion * * * * * * * * * 9
4. Agree * * * * * * * * * * * * 12
5. Strongly Agree * * * * * * 6 Blank 2

5. Providing on-going dialogue and interaction between students and teachers regarding contributions from various media presentations. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree 0
3. Neutral /No Opinion * * * * * 5
4. Agree * * * * * * * * * * * * * * * * * * 17
5. Strongly Agree * * * * * * * * 7 Blank 1

*6. Encouraging that students research the Web about sharing aesthetic ideas with students in other domains. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree * 1
3. Neutral /No Opinion * * * * * * * * * * 10
4. Agree * * * * * * * * * * 10
5. Strongly Agree * * * * * * * * 7 Blank 2

E. The Instructional strategies for using Web-based technologies in art education classrooms are:

*1. Tailoring the domains of Discipline-Based Art Education (DBAE) to research and instruction, exposing students to works from each content area. *1 2 3 4 5*

1. Strongly Disagree * * * 3
2. Disagree * 1
3. Neutral /No Opinion * * * * * * * * 8
4. Agree * * * * * * * * * * * 11
5. Strongly Agree * * * * * * * * * 9 Blank 0

*2. Including in the pedagogy an assessment phase, a planning phase, and a delivery platform. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree * * * 3
3. Neutral /No Opinion * * * * * * * * * 9
4. Agree * * * * * * * * * * * 11
5. Strongly Agree * * * * * * * 7 Blank 1

3. Having a concise purpose/specific goal when doing Internet exploration. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree * * 2
3. Neutral /No Opinion * * * * 4
4. Agree * * * * * * * 7
5. Strongly Agree * * * * * * * * * * * * * * * * * * 17 Blank 1

4. Having the option of sending picture and text files electronically for information, collection and distribution. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree 0
3. Neutral /No Opinion * * * * * * * 7
4. Agree * * * * * * * * * * * * 12
5. Strongly Agree * * * * * * * * * * * 11 Blank 0

*5. Using E-mail comments about instructional content on the Web Site. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree * 1
3. Neutral /No Opinion * * * * * * * * * * * * * * 14
4. Agree * * * * * * * * * * * * 12
5. Strongly Agree * * * * 4 Blank 0

6. Using a variety of windows to access historical, cultural, artists intent/beliefs, artist skills, audience expectation and display. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree 0
3. Neutral /No Opinion * * * 3
4. Agree * * * * * * * * * * * 11
5. Strongly Agree * * * * * * * * * * * * * * 14 Blank 2

7. Listing subject matter and explicitly suggesting instructional strategies that include a range of images, and contextual information. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree * 1
3. Neutral /No Opinion * * * * * * 6
4. Agree * * * * * * * * * * * * * * * 15
5. Strongly Agree * * * * * * * * 8 Blank 1

*8. Applying miscellaneous types of knowledge (e.g., art concepts, pedagogical method) to the Web. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree * 1
3. Neutral /No Opinion * * * * * * * 7
4. Agree * * * * * * * * * * * * * * * * 15
5. Strongly Agree * * * * * * 6 Blank 2

9. Displaying professionally designed teaching materials (skills and concepts) on the Web. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree 0
3. Neutral /No Opinion * * * * * * 6
4. Agree * * * * * * * * * 9
5. Strongly Agree * * * * * * * * * * * * * * * * 15 Blank 0

10 Formulating appropriate procedures or actions to resolve problems raised in the Web-based learning program. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree 0
3. Neutral /No Opinion * * * * * * * * 8
4. Agree * * * * * * * * * * * * 12
5. Strongly Agree * * * * * * * * * * 10 Blank 0

*11 Developing techniques to reduce the fear associated with the use of Web-based technologies. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree * * * 3
3. Neutral /No Opinion * * * * * * * * * * * * 12
4. Agree * * * * * * * * * * 10
5. Strongly Agree * * * * 4 Blank 2

III. Knowledge/Skills

F. The special knowledge and skills of Web-based technologies needed by art teacher education students are:

1. Posing and refining questions, analyzing and synthesizing vast amounts of information. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree * 1
3. Neutral /No Opinion * * * 3
4. Agree * * * * * * * * * * * * * 13
5. Strongly Agree * * * * * * * * * * * * * 13 Blank 1

*2. Developing an aesthetic critical appreciation for artworks created by technologies and presented on the Web. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree * * 2
3. Neutral /No Opinion * * * * * 5
4. Agree * * * * * * * * * * * * * * * * 15
5. Strongly Agree * * * * * * * * 8 Blank 0

*3. Knowing how to integrate specialized art knowledge with the skills of curriculum and instructional experts, programmers, and media support experts. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree * 1
3. Neutral /No Opinion * * * * 4
4. Agree * * * * * * * * * * * * * * * 14
5. Strongly Agree * * * * * * * * * * * 11 Blank 0

4. Having basic computer technical knowledge such as acquiring software and configuring Web browsers to access the resources contained in the Web. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree * 1
3. Neutral /No Opinion 0
4. Agree * * * * * * * * * * * * * * 13
5. Strongly Agree * * * * * * * * * * * * * * * * * * 17 Blank 0

5. Knowing how to locate, subscribe to and use the Web and Internet communication system (e.g., E-mail, Internet on-line) to obtain and exchange information from art museums, art education groups, and other resources. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree 0
3. Neutral /No Opinion 0
4. Agree * * * * * * * * * * * * 12
5. Strongly Agree * * * * * * * * * * * * * * * * * * 18 Blank 0

6. Knowing how to combine, link resources and address the sequencing of materials presented on the Web. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree 0
3. Neutral /No Opinion * * * 3
4. Agree * * * * * * * * * * * * * 13
5. Strongly Agree * * * * * * * * * * * * * * * 14 Blank 0

7. Incorporating design principles and composition knowledge and skills, such as color, shape, form, image manipulation, page layout and presentation into the Web sites. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree 0
3. Neutral /No Opinion * * * * 4
4. Agree * * * * * * * * * 9
5. Strongly Agree * * * * * * * * * * * * * * * * * * 17 Blank 1

*8. Determining the mix of lecture and Web-based technologies to use, based on professional judgement and a perception of the abilities of the class to absorb this knowledge. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree 0
3. Neutral /No Opinion * * * * * * * 7
4. Agree * * * * * * * * * * * * * * * 15
5. Strongly Agree * * * * * * * * 8 Blank 0

*9. Developing a sensitivity for what constitutes an effective Web page text, graphic, sound and animation in order to reflect the portfolio effectively. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree 0
3. Neutral /No Opinion * * * * 4
4. Agree * * * * * * * * * * * 11
5. Strongly Agree * * * * * * * * * * * * * * * * 16 Blank 0

10. Placing current Web-based art projects in historical perspective, linking them to past and possible future developments. *1 2 3 4 5*

1. Strongly Disagree 0
2. Disagree * 1
3. Neutral /No Opinion * * * * * * * * 8
4. Agree * * * * * * * * * * * * 12
5. Strongly Agree * * * * * * * * * * * * 11 Blank 0

IV. Evaluation Criteria

G. The criteria that should be used to evaluate the Web-based art education curricula are:

1. The concise program goals or philosophies , student performances, processes, products and/or learning outcomes. *1 2 3 4 5*

1. Strongly Disagree * 1
2. Disagree * 1
3. Neutral /No Opinion * * 2
4. Agree * * * * * * * * * * * * 12
5. Strongly Agree * * * * * * * * * * * * * * * * * * 16 Blank 0

*2. The general artistic criteria(e.g., principle of design, element of aethetic). *1 2 3 4 5*

1. Strongly Disagree * * * * 4
2. Disagree * * * 3
3. Neutral /No Opinion * * * * * * * * 8
4. Agree * * * * * * * 7
5. Strongly Agree * * * * * * * * * * 10 Blank 0

3. The quality of art content provided. *1 2 3 4 5*

1. Strongly Disagree * * * 3
2. Disagree * * 2
3. Neutral /No Opinion * * * * * 5
4. Agree * * * * * * * * * 9
5. Strongly Agree * * * * * * * * * * * * * 13 Blank 0

4. The effectiveness of the Web-based technologies in promoting student learning. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree 0
3. Neutral /No Opinion * 1
4. Agree * * * * * * * * * * * * * 13
5. Strongly Agree * * * * * * * * * * * * * * * * * * 16 Blank 0

*5. Engaging in students' self-criticism and encouraging on-line suggestions from peers about artworks. *1 2 3 4 5*

1. Strongly Disagree * * * 3
2. Disagree * 1
3. Neutral /No Opinion * * * * 4
4. Agree * * * * * * * * * * * * * 13
5. Strongly Agree * * * * * * * * * * * 11 Blank 0

6. Real world problems, client-direction problems, creative writing, etc. *1 2 3 4 5*

1. Strongly Disagree * * 2
2. Disagree * 1
3. Neutral /No Opinion * * * * * * * * * 9
4. Agree * * * * * * * * * * * 11
5. Strongly Agree * * * * * * * * * 9 Blank 0

7. Posing topics, issues, and authentic life-based situations for further investigation and stimulate professionalism among life long learners. *1 2 3 4 5*
   1. Strongly Disagree ** 2
   2. Disagree * 1
   3. Neutral /No Opinion **** 4
   4. Agree ************* 13
   5. Strongly Agree ************ 12 Blank 0
8. Having mobility among various aesthetic roles to place current Web-based art projects in historical perspective, linking them to the past and possible future developments. *1 2 3 4 5*
   1. Strongly Disagree ** 2
   2. Disagree * 1
   3. Neutral /No Opinion ********* 9
   4. Agree ************** 14
   5. Strongly Agree **** 4 Blank 2

Appendix E

Coefficient of Variation (CV) Values, Differences CVs, and Item-level Correlations between Round Two and Round Three

Items	Round-3 CV	Difference CV (Round 3 - Round 2)	Correlation between Two Rounds
Rationale/Issues			
A01	0.19	-0.016	0.95
A02	0.18	-0.065	0.70
A03	0.24	-0.042	0.69
A04	0.24	-0.018	0.96
A05	0.11	0.014	0.91
A06	0.20	-0.025	0.96
A07	0.23	-0.040	0.91
A08	0.31	-0.030	0.96
A09	0.11	-0.034	0.78
A10	0.27	-0.030	1.00
Design/Development Consideration			
B01	0.27	-0.020	0.96
B02	0.13	-0.032	0.87
B03	0.12	-0.036	0.86
B04	0.26	-0.029	1.00
B05	0.19	-0.030	0.94
B06	0.14	-0.014	0.90
B07	0.24	-0.016	0.88
C01	0.23	-0.012	0.96
C02	0.28	-0.094	0.83
C03	0.22	-0.030	0.98
C04	0.22	-0.022	0.98
C05	0.20	-0.040	0.96
C06	0.26	-0.048	0.96
C07	0.26	-0.007	1.00
C08	0.26	-0.042	0.99
D01	0.18	-0.067	0.85
D02	0.26	-0.073	0.92
D03	0.24	-0.020	0.97
D04	0.23	-0.052	0.91
D05	0.21	-0.037	0.95
D06	0.27	-0.022	0.96

(Continued)

(Continued)

Items	Round-3 CV	Difference CV Round-3 minus Round-2	Correlation between two Rounds
E01	0.28	-0.021	0.94
E02	0.27	-0.034	1.00
E03	0.20	-0.014	0.92
E04	0.21	-0.040	0.89
E05	0.23	-0.001	0.91
E06	0.20	-0.037	0.93
E07	0.20	-0.047	0.91
E08	0.21	-0.029	0.84
E09	0.23	-0.029	0.98
E10	0.24	-0.016	0.98
E11	0.27	-0.025	0.90
Knowledge/Skills			
F01	0.20	-0.018	0.96
F02	0.25	-0.037	0.95
F03	0.24	-0.015	1.00
F04	0.18	-0.017	0.97
F05	0.18	-0.017	1.00
F06	0.21	-0.008	0.98
F07	0.13	-0.047	0.86
F08	0.22	-0.023	0.93
F09	0.14	-0.009	0.96
F10	0.16	-0.021	0.89
Evaluation Criteria			
G01	0.19	-0.039	0.98
G02	0.35	-0.036	0.97
G03	0.25	-0.077	0.74
G04	0.20	-0.019	0.98
G05	0.27	-0.041	0.96
G06	0.27	-0.028	0.99
G07	0.25	-0.036	0.97
G08	0.28	-0.022	0.98

Appendix F

The Stability and Internal Reliability Coefficients for the Total Scale and Subscales of Round Three

	Total	A	B	C	D	E	F	G
Stability Index	0.96	0.90	0.90	0.99	0.89	0.91	0.99	0.98
Alpha Number	0.94	0.82	0.61	0.91	0.82	0.93	0.88	0.88

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